National Institute of Environmental Health Sciences

Climate change vulnerability and resilience: Current status and trends for Mexico

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Abstract:

Climate change alters different localities on the planet in different ways. The impact on each region depends mainly on the degree of vulnerability that natural ecosystems and human-made infrastructure have to changes in climate and extreme meteorological events, as well as on the coping and adaptation capacity toward new environmental conditions. This study assesses the current resilience of Mexico and Mexican states to such changes, as well as how this resilience will look in the future. In recent studies (Moss et al. in Vulnerability to climate change: a quantitative approach. Pacific Northwest National Laboratory, Washington DC, 2001; Brenkert and Malone in Clim Change 72:57-102, 2005; Malone and Brenkert in Clim Change 91:451-476, 2008), the Vulnerability-Resilience Indicators Model (VRIM) is used to integrate a set of proxy variables that determine the resilience of a region to climate change. Resilience, or the ability of a region to respond to climate variations and natural events that result from climate change, is given by its adaptation and coping capacity and its sensitivity. On the one hand, the sensitivity of a region to climate change is assessed, emphasizing its infrastructure, food security, water resources, and the health of the population and regional ecosystems. On the other hand, coping and adaptation capacity is based on the availability of human resources, economic capacity, and environmental capacity. This paper presents two sets of results. First, we show the application of the VRIM to determine state-level resilience for Mexico, building the baseline that reflects the current status. The second part of the paper makes projections of resilience under socioeconomic and climate change and examines the varying sources and consequences of those changes. We used three tools to examine Mexico's resilience in the face of climate change, i. e., the baseline calculations regarding resilience indices made by the VRIM, the projected short-term rates of socioeconomic change from the Boyd-Ibarrarán computable general equilibrium model, and rates of the IPCC-SRES scenario projections from the integrated assessment MiniCAM model. This allows us to have available change rates for VRIM variables through the end of the twenty-first century. © Springer Science+Business Media B.V. 2009.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A1, SRES A2

Communication: ☑

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☑

audience to whom the resource is directed

Researcher

Exposure : ☑

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Extreme Weather Event, Food/Water Security, Food/Water Security

Extreme Weather Event: Drought

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Non-U.S. North America

Health Impact: ☑

specification of health effect or disease related to climate change exposure

General Health Impact

Intervention: ☑

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children, Elderly, Low Socioeconomic Status, Pregnant Women

Resource Type:

format or standard characteristic of resource

Research Article

Resilience:

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Socioeconomic Scenario: Other Socioeconomic Scenario

Other Socioeconomic Scenario: Boyd-Ibarraran computable general equilibrium model

Timescale:

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content